

## CLAIMS

Sub A<sup>c</sup> 7

- 1 1. An arbiter which arbitrates between a plurality of  
2 clients generating requests for access to a resource in a  
3 computing environment, comprising:  
4 a memory, comprising for each of the plurality of  
5 clients:  
6 a request register, which is adapted to record  
7 the respective client's access requests; and  
8 a next-client pointer, which is adapted to  
9 record an identification of another one of the  
10 clients making a subsequent request to access the  
11 resource, so as to form a linked list of the  
12 requests; and  
13 logic circuitry which is adapted to decide,  
14 responsive to the linked list, which of the plurality of  
15 clients is given access to the resource.
- 1 2. An arbiter according to claim 1, wherein the memory  
2 comprises at least one list-terminating pointer which  
3 indicates an end of the linked list.
- 1 3. An arbiter according to claim 2, wherein the at  
2 least one list-terminating pointer comprises a tail  
3 pointer which indicates a last client in the linked list.
- 1 4. An arbiter according to claim 2, wherein the at  
2 least one list-terminating pointer comprises a head  
3 pointer which indicates a first client in the linked  
4 list, and wherein the logic circuitry is operative to  
5 decide, responsive to the head pointer, which of the  
6 plurality of clients is given access to the resource.
- 1 5. An arbiter according to claim 1, wherein the logic

Sub A<sup>7</sup>  
2 circuitry is operative to check whether a client  
3 requesting access to the resource has a pending access  
4 request, and to update a record of the number of pending  
5 access requests recorded in the respective register  
6 responsive to the check.

1 6. An arbiter according to claim 1, wherein the logic  
2 circuitry is operative to check whether the resource is  
3 available, and to allocate the resource responsive to the  
4 check.

1 7. An arbiter according to claim 1, and comprising at  
2 least one buffer wherein requests from a specific client  
3 are stored before being recorded in the respective  
4 request register.

1 8. An arbiter according to claim 1, and comprising a  
2 first-in first-out memory wherein requests from the  
3 plurality of clients are stored before being transferred  
4 sequentially to the memory and the logic circuitry.

1 9. An arbiter according to claim 1, wherein the memory  
2 comprises:

3 for at least some of the clients, a priority flag  
4 which is adapted to record a priority for access to the  
5 resource for the at least some clients; and

6 at least one list-terminating pointer for the  
7 priority, which indicates an end of the linked list for  
8 the at least some clients.

1 10. An arbiter according to claim 9, wherein the logic  
2 circuitry is adapted to decide, responsive to the linked  
3 list and the priority flag, which of the clients is given  
4 access to the resource.

Sub A<sup>c</sup> 7

1 11. An arbiter according to claim 1, wherein the logic  
2 circuitry is of a size that is substantially independent  
3 of the number of clients served by the arbiter, and  
4 wherein the circuitry is adapted to decide, responsive to  
5 the recorded requests, which of the plurality of clients  
6 is given access to the resource.

1 12. An arbiter according to claim 1, wherein a size of  
2 the memory scales as a product of the number of clients  
3 and a logarithm of the number of clients.

1 13. An arbiter serving a plurality of clients that  
2 generate requests for access to a resource in a computing  
3 environment, comprising:

4 a memory, comprising a respective register assigned  
5 to each of the plurality of clients, which register is  
6 adapted to record the respective client's access requests;  
7 and

8 logic circuitry, of a size that is substantially  
9 independent of the number of clients served by the  
10 arbiter, which circuitry is adapted to decide, responsive  
11 to the recorded requests, which of the plurality of  
12 clients is given access to the resource.

1 14. An arbiter according to claim 13, wherein the size  
2 of the memory scales as a product of the number of  
3 clients and a logarithm of the number of clients.

1 15. A method for arbitrating between a plurality of  
2 clients generating requests for access to a resource in a  
3 computing environment, comprising:

4 for each of the plurality of clients, recording the  
5 client's access requests in a respective, dedicated memory

Sub A' 7  
6 register;

7 recording for each of the clients, responsive to the  
8 requests, a next-client pointer to a subsequent one of  
9 the clients requesting the resource, so as to form a  
10 linked list of the clients; and  
11 giving the clients access to the resource responsive  
12 to the linked list.

1 16. A method according to claim 15, wherein recording  
2 the next-client pointer comprises pointing to an end of  
3 the linked list with a list-terminating pointer.

1 17. A method according to claim 16, wherein pointing to  
2 the end of the linked list comprises pointing to a last  
3 client in the linked list with a tail pointer.

1 18. A method according to claim 16, wherein pointing to  
2 the end of the linked list comprises pointing to a first  
3 client in the linked list with a head pointer, and  
4 wherein giving the clients access to the resource  
5 comprises giving the clients access to the resource  
6 responsive to the head pointer.

1 19. A method according to claim 15, wherein recording  
2 the client's access requests comprises checking if a  
3 client requesting access to the resource has a pending  
4 request, and updating the memory register responsive to  
5 the check.

1 20. A method according to claim 15, wherein giving the  
2 clients access comprises checking whether the resource is  
3 available, and allocating the resource responsive to the  
4 check.

1 21. A method according to claim 15, wherein recording

Sub A-7  
2 the client's access requests comprises providing at least  
3 one buffer and storing the requests from the client in  
4 the buffer prior to recording the client's access  
5 requests.

1 22. A method according to claim 15, wherein giving the  
2 clients access comprises assigning priorities to at least  
3 some of the clients, and forming a linked list of the  
4 prioritized clients.

1 23. A method according to claim 22, wherein giving the  
2 clients access to the resource comprises deciding,  
3 responsive to the assigned priorities and the linked  
4 list, which of the clients is given access to the  
5 resource.

1 24. A method for arbitrating between a plurality of  
2 clients generating requests for access to a resource in a  
3 computing environment, comprising:

4 for each of the plurality of clients, recording the  
5 client's access requests;

6 providing logic circuitry of a size that is  
7 substantially independent of the number of the plurality  
8 of clients; and

9 utilizing the logic circuitry to decide, responsive  
10 to the recorded requests, which of the plurality of  
11 clients is given access to the resource.